II. THE DRAWINGS SATISFY ALL FORMAL REQUIREMENTS

The Office Action objects to the drawings for failure to show the concave portion formed on the outside of the optical component case. The specification and claim 9 have amended to change "concave portion" to recite a --recess--. Withdrawal of the objection to the drawings is respectfully requested.

III. THE CLAIMS SATISFY ALL FORMAL REQUIREMENTS

The Office Action objects to claims 1-9 because of informalities. The claims have been amended according to the Examiner's suggestions. Accordingly, withdrawal of the rejection to claims 1-9 is respectfully requested.

IV. THE CLAIMS SATISFY THE REQUIREMENTS OF 35 U.S.C. §112

The Office Action rejects claims 3, and 6-9 under 35 U.S.C. §112, second paragraph, as indefinite. Claims 3 and 6-9 are amended to obviate the rejection. Withdrawal of the rejection under 35 U.S.C. §112, second paragraph, is respectfully requested.

V. THE CLAIMS DEFINE ALLOWABLE SUBJECT MATTER

The Office Action rejects claims 1, 4 and 5 under 35 U.S.C. §102(e) as being unpatentable over U.S. Patent No. 6,254,238 to Takamatsu; and claim 2 under 35 U.S.C. §103(a) as being unpatentable over Takamatsu in view of U.S. Patent No. 6,334,686 to Shiraishi. The rejections are respectfully traversed.

In accordance with the claimed invention, the projector has a light source; ....; at least one bent portion formed on the exhaust duct to bend an exhaust stream discharged from the centrifugal fan, wherein the bent portion changes the direction of the exhaust stream by approximately ninety degrees relative to the direction of the exhaust stream at the air discharge hole of the centrifugal fan.

According to the above arrangement, the noise from the fan can be greatly reduced and the exhaust stream can be prevented from directly blown to an observer, thus eliminating unpleasant feeling.

Fig. 1 of Takamatsu shows that the outlet 3 is located on the side of projection lens 20. Since the noise from a centrifugal fan is directly leaked to the outside, no noise reduction can be achieved by the arrangement in Fig. 1 of Takamatsu. Another arrangement where the duct is widened toward the outlet 3 is shown in Fig. 3 thereof.

However, such arrangement shows no bent portion that "changes the direction of the exhaust stream by approximately ninety degrees relative to the direction of the exhaust stream at the air discharge hole of the centrifugal fan," as recited in claim 1. Instead, according to the arrangement, since the diameter of the outlet is widened toward the outside, the noise from the centrifugal fan is likely to be amplified.

On the other hand, an arrangement having exhaust stream direction at the fan exhaust hole different from that of the duct outlet hole is shown in Shiraishi. However, Shiraishi only divides the air-introducing channel from a cooling fan for cooling optical components, and is not related to an exhaust system directed toward the outside. Further, since the air-introducing channel has to be divided, a plurality of exhaust holes are requisite. There is no advantage in applying Shiraishi's arrangement in an exhaust system directed toward the outside of a casing, since it merely complicates the structure and lowers the exhaust efficiency.

For at least these reasons, it is respectfully submitted that independent claim 1 is distinguishable over the applied art. The remainder of the claims that depend from independent claim 1 are likewise distinguishable over the applied art for at least the reasons discussed, as well as for the additional features they recite.

VI. CONCLUSION

For at least these reasons, it is respectfully submitted that this application is in condition for allowance.

Should the Examiner believe that anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the Applicants' representative at the telephone number listed below.

Respectfully submitted,

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JAO:EDM/sdb

Attachments:
Appendix
Copy of PTO Receipt for Filing of Papers

Date: December 26, 2002

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

APPENDIX

Changes to Specification:

Page 5, lines 5-8:

In the present invention, the intake duct may preferably be constructed by combining a ~~concave portion~~recess formed on the outside of the optical component case and a lid member shutting the ~~concave portion~~recess, the lid member and the partition member being integrated.

Page 13, line 30- page 14, line 5:

On the other hand, a ~~concave portion~~recess 47B is formed on a part of the bottom backside of the inner case 47 and an exhaust opening 47A is formed on the bottom backside continuing from the ~~concave portion~~recess 47B. A first upper partition member 72 projecting toward the lid member 61, a second upper partition member 73 as a light source partition and a lower frame 74 are formed on the bottom backside of the inner case 47. The respective ends of the first upper partition member 72 and the first lower partition member 62, the second upper partition member 73 and the second lower partition member 63, the lower frame 74 and the upper frame 64 respectively contact with each other.

Page 14, lines 6-12:

The frame formed by the rising portion 61B and the side portion 61C of the lid member 61 is fitted to a space defined by the ~~concave portion~~recess 47B, the first upper partition member 72 and the first lower partition member 62. Accordingly, the space between the lid member 61 and the inner case 47, in other words, the space between the exhaust duct 51 and the inner case 47 is surrounded by a frame, the space defining the intake duct 60 which continues to the opening 61A of the lid member 61 and the air intake 50B of the sirocco fan 50.

Page 16, lines 19-24:

(12) Since the intake duct 60 is formed by combining the recess~~concave portion~~ 47B formed on the outside of the inner case 47 and the lid member 61 shutting the recess~~concave portion~~ 47B and the lid member 61, the ~~first~~ lower partition member 62, and the second lower partition member 63 are integrated, the lid member 61 and the partition members 62 and 63 do not have to be manufactured as separate components, thereby omitting work and components required therefor.

Changes to Claims:

The following is a marked-up version of the amended claims:

1. (Amended) A projector, comprising:

a light source;

an electric optical device that modulates a light irradiated from the light source in accordance with an image information to form an optical image;

a projecting optical system that enlarges and ~~projecting~~ projects the optical image formed by the electric optical device;

a casing ~~that~~ having a side, the casing accommodates the light source, the electric optical device and the projecting optical system;

a centrifugal fan disposed around the light source that ~~inhales an~~draws in air by ~~a~~ rotation thereof and ~~that~~ discharges the air in a tangential direction ~~of~~ to the rotation;

an exhaust duct accommodated in the casing, the exhaust duct having a first end connected to an air discharge hole of the centrifugal fan and a second end connected to an exhaust hole formed at the front of the casing ~~for~~ where the projecting optical system ~~to be~~ is exposed; and

at least one bent portion formed on the exhaust duct to bend an exhaust stream discharged from the centrifugal fan, wherein the bent portion changes the direction of the

exhaust stream by approximately ninety degrees relative to the direction of the exhaust stream at the air discharge hole of the centrifugal fan.

3. (Amended) The projector according to claim 1, wherein the cross section of the exhaust duct has a larger diameter along the ~~inside~~ side of the casing than the diameter in a direction orthogonal with the ~~inside~~ side of the casing.

6. (Amended) The projector according to claim 5, wherein an opening that introduces the cooling air is formed on a side of the optical component case opposite to a side along with the intake duct is provided, and a disposition of the opening corresponds to a disposition of the optical components accommodated in the optical component case.

7. (Amended) The projector according to claim 5, wherein an exhaust opening that discharges the air having cooled the optical components is formed on the optical component case, a disposition of the exhaust opening corresponds to a disposition of the light source accommodated therein,

the centrifugal fan is disposed on the exhaust opening with the air intake of the centrifugal fan ~~being faced~~facing upward, and

a partition member is provided that divides an after-cooling air transferred from the light source and an after-cooling air transferred from the other optical components ~~is provided~~ to the exhaust opening.

8. (Amended) The projector according to claim 7, wherein a light source partition is provided that divides the after-cooling air transferred from a light-irradiating side of the light source and the after-cooling air transferred from the backside of the light source ~~is provided~~ to the exhaust opening.

9. (Amended) The projector according to claim 8, wherein the intake duct is constructed by combining a ~~concave portion~~recess formed on the outside of the optical

component case and a lid member shutting the ~~concave portion~~recess, the lid member and the partition member being integrated.

PTO RECEIPT FOR FILING OF PAPERS

The following papers have been filed:

App Tran, ck#123037, $710, spec/clms(9)/abst - 20 pgs, 9 pgs drwgs (figs 1-9), Cert Cpy JP#2000-294686 filed 9-27-00

Name of Applicant: Hirohisa NAKANO; Nobuo WATANABE; Haruyoshi YAMADA

Serial No.: New U.S. Patent Application

Atty. File No.: 110662

Title (New Cases): PROJECTOR

Sender's Initials: JAO/kaf 73/27

PATENT OFFICE DATE STAMP

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